

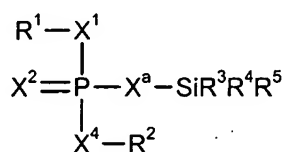
IN THE CLAIMS

1. (currently amended): An oligonucleotide comprising at least one pentavalent internucleotide phosphorus atom protected with a group of formula $-X^aSiR^3R^4R^5$ wherein X^a represents O or S, and R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups, selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more.

2. (original): An oligonucleotide according to claim 1, wherein the group of formula $-X^aSiR^3R^4R^5$ is a tert-butyldimethylsilyloxy group.

3. (original): An oligonucleotide according to either of claims 1 and 2, wherein a single group of formula $-X^aSiR^3R^4R^5$ is located at the terminal internucleotide linkage.

4. (currently amended): An oligonucleotide according to claim 1, having the Formula (1):



Formula (1)

wherein:

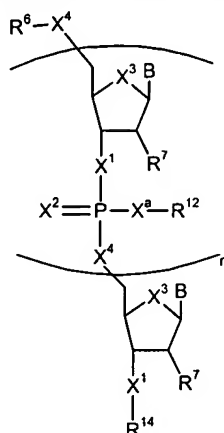
R^1 and R^2 independently are nucleoside, nucleotide or oligonucleotide moieties;
 R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups, selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more;

X^a represents O or S, preferably O;

X^1 and X^4 are each independently -O-, -CH₂-, -S- or NRⁿ, where Rⁿ represents H or C₁₋₄ alkyl, preferably both of X^1 and X^4 being O; and

X^2 is O or S, preferably S.

5. (original): An oligonucleotide according to claim 4, wherein X^1 , X^a and X^4 are each O, and one of R^3 , R^4 and R^5 represents a tert-butyl group, with the others representing methyl groups.
6. (original): An oligonucleotide according to either claims 4 and 5, wherein R^1 is a nucleotide substituted at the 3'-position by X^1 , and R^2 represents an oligonucleotide substituted at the 5'-position by X^4 .
7. (currently amended): An oligonucleotide according to claim 4, of Formula (2):



Formula (2)

wherein:

X^a for each occurrence is independently -O- or S-;

X^1 and X^4 are, independently, -O-, -CH₂-, -S- or NRⁿ, where Rⁿ represents H or C₁₋₄ alkyl;

X^2 for each occurrence is O or S;

X^3 for each occurrence is, independently, -O-, -S-, -CH₂-, or -(CH₂)₂-;

R^6 is H, an alcohol protecting group, an amino protecting group or a thio protecting group;

R^7 for each occurrence is, independently, -H, -F -OR⁸, -NR⁹R¹⁰, -SR¹¹, or a substituted or unsubstituted aliphatic group, such as methyl or allyl;

R^8 for each occurrence is, independently, -H, a substituted or unsubstituted aliphatic group (e.g., methyl, ethyl, methoxyethyl or allyl), a substituted or unsubstituted aryl

group, a substituted or unsubstituted aralkyl group, an alcohol protecting group, or -
(CH₂)_q-NR^xR^y;

R⁹ and R¹⁰ for each occurrence are each, independently, -H, a substituted or unsubstituted aliphatic group, or an amine protecting group, or R⁹ and R¹⁰ taken together with the nitrogen to which they are attached are a heterocyclyl group;

R¹¹ for each occurrence is, independently, -H, a substituted or unsubstituted aliphatic group, or a thio protecting group;

R¹² for each occurrence is, independently, a phosphorus protecting group, provided that at least one R¹² represents a group of formula -SiR³R⁴R⁵, in which R³, R⁴ and R⁵ are as previously defined each independently optionally substituted hydrocarbonyl groups, selected such that that total number of carbon atoms in R³ plus R⁴ plus R⁵ is 4 or more;

R¹³ is for each occurrence is, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group or a substituted or unsubstituted aralkyl group;

R¹⁴ is H a hydroxy protecting group, a thio protecting group, an amino protecting group, -(CH₂)_q-NR^xR^y, a solid support, or a cleavable linker attached to a solid support;

R^x and R^y are each, independently, -H, a substituted or unsubstituted aryl group, a substituted or unsubstituted heteroaryl group, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted heteroaralkyl group or an amine protecting group, or, R^x and R^y taken together with the nitrogen to which they are attached form a heterocyclyl group;

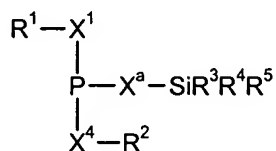
q is an integer from 1 to about 6;

B is -H, a natural or unnatural nucleobase, or a protected natural or unnatural nucleobase; and

n is a positive integer.

8. (original): An oligonucleotide according to claim 7, wherein each X¹, X³ and X⁴ are O; R⁶ is H or an alcohol protecting group; R⁷ is H, F, OCH₃, OCH₂CH₂OCH₃ or O-protecting group; R¹² is -CH₂CH₂CN or tert-butyldimethylsilyl, provided at least one R¹² is tert-butyldimethylsilyl; R¹⁴ is H or a cleavable linker attached to a solid support, and n is from 8 to 40.

9. (original): A process for the preparation of a compound of Formula (1) as defined in claim 4, which comprises oxidising or sulfurising a compound of Formula (3):

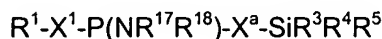


Formula (3)

wherein R^1 , R^2 , R^3 , R^4 , R^5 , X^a , X^1 and X^4 are as defined in claim 4.

10. (canceled)

11. (currently amended): A compound of Formula (4):



wherein ~~R^1 , R^3 , R^4 , R^5 , X^a and X^1 are as defined in claim 4,~~

R^1 is a nucleoside, nucleotide or oligonucleotide moiety;

R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups,

selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or

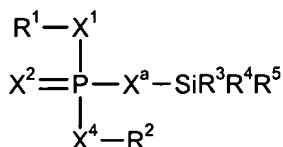
more;

X^a represents O or S;

X^1 is $-\text{O}-$, $-\text{CH}_2-$, $-\text{S}-$ or NR^n , where R^n represents H or C_{1-4} alkyl; and

R^{17} and R^{18} are each, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, a substituted or unsubstituted aralkyl or R^{17} and R^{18} taken together with the nitrogen to which they are bound form a heterocyclyl group.

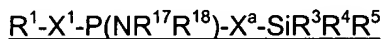
12. (currently amended): A process for the preparation of a compound of Formula (1) ~~as defined in claim 4~~



Formula (1)

which comprises:

a) coupling a compound of Formula (4) ~~as defined in claim 11,~~



with a compound of formula $\text{R}^2-\text{X}^4-\text{H}$ ~~wherein R^2 and X^4 are as defined in claim 4,~~ in the presence of an activator; and b) oxidising or sulfurising the product of step a) wherein

R^1 and R^2 independently are nucleoside, nucleotide or oligonucleotide moieties;
 R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups,
selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more;

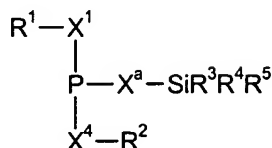
X^a represents O or S;

X^1 and X^4 are each independently -O-, -CH₂-, -S- or NRⁿ, where Rⁿ represents H or C₁₋₄ alkyl;

X^2 is O or S; and

R^{17} and R^{18} are each, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, a substituted or unsubstituted aralkyl or R^{17} and R^{18} taken together with the nitrogen to which they are bound form a heterocycl group.

13. (currently amended): A process for the preparation of a compound of Formula (3) ~~as defined in claim 10~~



Formula (3)

which comprises coupling a compound of Formula (4) ~~as defined in claim 11~~,



with a compound of formula $\text{R}^2-\text{X}^4-\text{H}$ wherein R^2 and X^4 are as defined in claim 4, in the presence of an activator

wherein

R^1 and R^2 independently are nucleoside, nucleotide or oligonucleotide moieties;

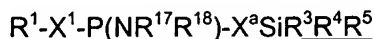
R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups, selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more;

X^a represents O or S;

X^1 and X^4 are each independently -O-, -CH₂-, -S- or NRⁿ, where Rⁿ represents H or C₁₋₄ alkyl; and

R^{17} and R^{18} are each, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, a substituted or unsubstituted aralkyl or R^{17} and R^{18} taken together with the nitrogen to which they are bound form a heterocyclyl group.

14. (currently amended): A process for the preparation of a compound of Formula (4) as defined in claim 11,



which comprises reacting a compound of formula $\text{R}^1\text{-X}^1\text{-H}$, wherein R^1 and X^1 are as defined in claim 4 with a compound of formula $\text{R}^3\text{R}^4\text{R}^5\text{Si-X}^a\text{-P}(\text{NR}^{17}\text{R}^{18})_2$ wherein X^a , R^3 , R^4 , R^5 , R^{17} and R^{18} are as defined in claim 5

R^1 is a nucleoside, nucleotide or oligonucleotide moiety;

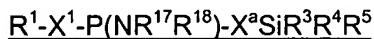
R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups, selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more;

X^a represents O or S;

X^1 is -O-, -CH₂-, -S- or NR^n , where R^n represents H or C₁₋₄ alkyl; and

R^{17} and R^{18} are each, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, a substituted or unsubstituted aralkyl or R^{17} and R^{18} taken together with the nitrogen to which they are bound form a heterocyclyl group.

15. (currently amended): A process for the preparation of a compound of Formula (4)



wherein X^a is O which comprises a) reacting a compound of formula $\text{R}^1\text{-X}^1\text{-H}$, wherein R^1 and X^1 are as defined in claim 4 and with a compound of formula $\text{Z-P}(\text{NR}^{17}\text{R}^{18})_2$ wherein R^{17} and R^{18} are as defined in claim 11 and Z represents a leaving group, preferably a chlorine atom, to form a compound of formula $\text{R}^1\text{-X}^1\text{-P}(\text{NR}^{17}\text{R}^{18})_2$; b) hydrolysing the compound of formula $\text{R}^1\text{-X}^1\text{-P}(\text{NR}^{17}\text{R}^{18})_2$ to form a compound of formula $\text{R}^1\text{-X}^1\text{-PH(=O)(NR}^{17}\text{R}^{18})$, the hydrolysis preferably taking place in the presence of a weak acid, such as tetrazole, S-ethyltetrazole, or an imidazole salt; and c) reacting the compound of formula $\text{R}^1\text{-X}^1\text{-PH(=O)(NR}^{17}\text{R}^{18})$ with a

silylating agent of formula $Y^1-SiR^3R^4R^5$ wherein Y^1 is a leaving group, to form the compound of Formula (4)

wherein

R^1 is a nucleoside, nucleotide or oligonucleotide moiety;

R^3 , R^4 and R^5 each independently are optionally substituted hydrocarbyl groups, selected such that that total number of carbon atoms in R^3 plus R^4 plus R^5 is 4 or more;

X^1 and X^4 are each independently -O-, -CH₂-, -S- or NRⁿ, where Rⁿ represents H or C₁₋₄ alkyl;

R^{17} and R^{18} are each, independently, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, a substituted or unsubstituted aralkyl or R^{17} and R^{18} taken together with the nitrogen to which they are bound form a heterocyclyl group;

Y^1 and Z each independently represent a leaving group.

16. (canceled)

17. (canceled)

18. (canceled)

19. (canceled)

20. (canceled)

21. (canceled)

22. (canceled)

23. (canceled)

24. (new): An oligonucleotide according to claim 4 wherein X^1 , X^3 and X^4 are each O and X^2 is S.